178 Varietal effects of barley carbohydrate composition on digestibility, fermentability and microbial ecophysiology in an in vitro model of the pig gastrointestinal tract. J. Bindelle1,2, R. Pieper3,4, B. Rossnagel4, A. Van Kessel*4, and P. Leterme3,4, 1*Fonds national de la Recherche scientifique, Belgium*, 2*Gembloux Agricultural University, Belgium*, 3*Prairie Swine Centre Inc., Canada*, 4*University of Saskatchewan, Canada*.

Carbohydrate (CHO) composition can vary markedly between barley varieties. Their influence on digestibility, intestinal fermentation and microbiota in pigs was studied in vitro. Ten hulless (HLB) and 6 hulled barleys (HB) differing in B-glucan, non-starch polysaccharides (NSP), starch content, and amylose/amylopectin ratio, were hydrolyzed enzymatically and subsequently fermented for 72h. CHO fermentation kinetics were modeled; microbial composition and short-chain fatty acid (SCFA) production were analyzed.

In HLB, in vitro DM digestibility was positively correlated to starch and amylopectin content and CP digestibility to amylopectin ($P<0.05$), whereas both were negatively correlated to insoluble NSP ($P<0.05$). Rate of fermentation was different ($P<0.01$) between barley types but not correlated to the CHO composition. However, high B-glucan contents induced faster fermentation ($P<0.05$, HLB; $P<0.10$, HB). SCFA molar ratios after fermentation of HLB were higher in propionate and branchedchain fatty acids and lower in acetate compared to HB ($P<0.01$). With HLB, amylose content was positively correlated to butyrate production and negatively to propionate, which was positively correlated to soluble NSP content ($P<0.01$). In HB, no correlation between SCFA production and the carbohydrate composition was found. TRFLP analysis revealed that Bacteroides and members of Clostridium cluster XIVa were differentially affected in HLB compared to HB as well as by the type and source of CHO. Microbial profiles were also correlated ($P<0.05$) to SCFA and fermentation parameters but response differed significantly between HB and HLB. The strongest correlation between CHO structure, microbial abundance and fermentation parameters was evident in HLB. Hulless barleys may offer the greatest opportunity to improve gut health in pigs.

Key Words: barley, fermentation, microbiota

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ABSTRACTS
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